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STIRLING LABORATORY RESEARCH ENGINES

The Stirling engine has high thermal efficiency, low noise and vibration levels, low emissions, multi-fuel capability, and application ranging from solar electricity generation to automotive propulsion. The problems with current commercial developments include difficult gas sealing, material challenges, complex analytical modeling, high cost, and proprietary barriers.

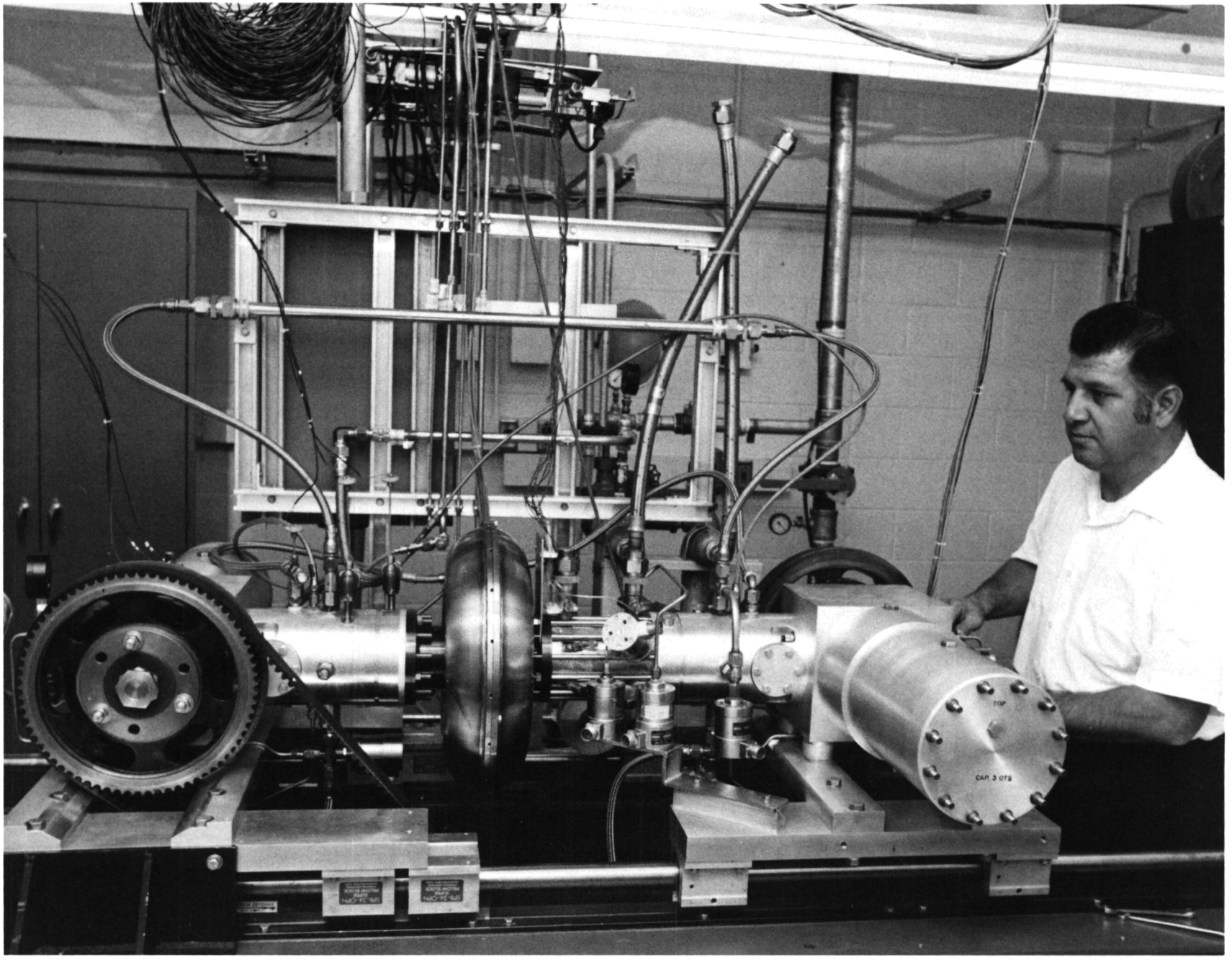
Until recently, there was no on-going basic research program in the United States. As one step in expanding the basic knowledge relative to and supporting the development of Stirling engines, NASA is sponsoring a JPL project which will lead to a versatile test engine. One objective of this program is to lay the ground work for an industry-produced version of the engine that will support the requirements of educators and researchers in academic, industrial, and government laboratories.

The preprototype engine represents the first assembled engine and is being used to support the development of a broad range of analytical modeling and experimental efforts. The engine is a horizontally opposed, single-action Stirling engine with a dual-crankshaft drive mechanism. The preprototype configuration uses helium gas and is heated within a closed-cycle system by an external electrical source.

Preliminary experimental results obtained during engine tests compared favorably with analytical prediction models. The potential for a fully operational test engine was established.

(The Stirling engine derives its name from Robert Stirling, Scottish engineer, who conceived the idea of an air engine using a regenerator.)

Figure (opposite page): The Stirling laboratory research engine built by JPL is shown here in the preprototype phase. It is being used to support the development of testing and analysis of the Stirling engine in the United States.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